Measuring Outsourcing Relationship Quality: Towards a Social Network Analysis Approach

Full Paper

Pascal Yann-Holger Lüders
University of Bamberg
pascal-yann-holger.lueders@stud.uni-bamberg.de

Christian Jentsch
University of Bamberg
christian.jentsch@uni-bamberg.de

Daniel Beimborn
Frankfurt School of Finance & Management
d.beimborn@fs.de

Abstract

Outsourcing initiatives are complex undertakings requiring careful management of the client/vendor relationship. While monitoring the vendor's performance is a common practice, insight into the status of the 'soft' aspects of the relationship, such as trust, is often not available, although research highlights the social aspects as a critical success factor. However, monitoring the softer facets' quality is difficult: Vendor managers track the status of the soft aspects, if at all, using survey tools among involved staff. This has shortcomings because it does not only capture subjective perceptions, but also interrupts the daily business of the participants. To develop a more objective instrument that collects data without interfering daily business, we draw on social network analysis. We suggest an approach that will eventually allow managers to monitor relationship quality in an efficient and objective way. The results suggest metrics to measure the soft factors of a relationship, such as trust and commitment.

Keywords

Outsourcing, Relationship Quality, Social Network Analysis

Introduction

Various studies have estimated the failure rate of outsourcing initiatives to be 25% and higher (Goles and Chin 2005; Rottman 2008). One frequently cited reason for failure is weak management of the client/vendor outsourcing relationship (Gonzalez et al. 2005). Since research has highlighted that a strong social relationship can, e.g., compensate for smaller disruptions in the service delivery and particularly helps to create a tight, strategic and proactive partnership (Goles and Chin 2005), outsourcing management should focus on the softer factors of the organizational relationship, such as commitment, trust, respect, and shared understanding (Beimborn 2012). This relationship management can complement performance reports which are already a natural part of the outsourcing governance.

There are, however, problems with soft facets of the outsourcing relationship quality: they are difficult to measure and difficult to be captured in an objective way. While the most common measurement instrument for relationship quality seems to be a structured survey or poll of the relationship quality perceived by top managers, team leads, and involved staff (e.g. Beimborn 2012; Goles and Chin 2005; Goo et al. 2009), this type of measurement approach only analyzes the subjective perception of reality and the answers might be limited to, or even biased by, a "gut-feeling" rather than a well-reasoned answer (Jentsch et al. 2014). Moreover, completing a poll or survey every couple of weeks interrupts daily work and requires time and effort, which in turn is likely to reduce participation rates and well-reflected answering behavior. In this paper, we tackle these problems by drawing on social network analysis (SNA) and the underlying theory to suggest an approach that will eventually allow vendor managers to monitor outsourcing relationship quality in an efficient and less subjective way.

SNA, originating in sociology and anthropology (Wasserman and Faust 1994), has been used in many applications, ranging from history (Padgett and Ansell 1993), to marketing (Hinz et al. 2011), software development (Nielsen and Tjørnehøj 2010) and fighting terrorism (Walther and Christopoulos 2012). In this paper, we look at SNA methods to explore how vendor-client network data can be interpreted to infer the quality of the relationship between the two partners. By 'outsourcing relationship' we refer to the *organizational* relationship between a client and its vendor. By network data we mean all (potentially) available data that indicates communication interactions (e.g. emails, calls etc.) between individual actors in the network (i.e. the activity graph of the network). Our research question is:

How can social network *analysis be employed*
to monitor the relationship quality of an outsourcing relationship?

As answer to this question, we develop a set of SNA metrics and ground them on the literature in the fields of outsourcing management, distributed teams, and IS development projects. Those metrics can in future research be used to develop an automated relationship quality tracking solution that helps executives to track the quality of their outsourcing arrangements. This system can serve as an early warning system which indicates conspicuities in the current relationship that might lead to serious issues in a particular outsourcing arrangement.

The remaining paper first describes the theoretical background, including the concept of relationship quality and then provides a brief overview of SNA (section 2), followed by a description of the research method applied (section 3). As key contribution, we present several metrics and specify the metric values that indicate the level of relationship quality. Thus, our study develops concepts on how outsourcing relationship quality could be predicted using SNA metrics. The paper closes with a discussion of the results and its value for science and practice as well as an outlook on further research.

Research Background

Outsourcing Relationship Quality

According to Beimborn and Blumenberg (2007), IT outsourcing relationship quality describes the "qualitative characteristics of an inter-organizational relationship between a service receiver and provider to achieve the participants' shared goals." In their quantitative study, Goles and Chin (2005) identify eleven critical factors that form the construct of relationship quality: The authors distinguish between relational attributes like trust and commitment and relationship processes such as communication and conflict resolution. These critical factors have been further narrowed down to the seven most critical factors for outsourcing success (Beimborn, 2012). In a related study we recently conducted interviews with 16 relationship managers to further validate and strengthen the factors of relationship quality (Jentsch et al. 2015). As a result of these interviews we further reduced the critical aspects of relationship quality to five key dimensions: Communication, commitment, trust, mutual understanding and fairness. Several dimensions explicitly treated in previous studies were consolidated here (e.g. identification as part of commitment). In our study, we will focus on these five factors and describe them briefly in the following:

Communication describes the efficiency and effectiveness of information exchange between partners" (Blumenberg et al. 2009, p. 4). This definition covers two aspects of an ideal communication process. First, the content of communication implies novel and critical information for the task (effectiveness). Secondly, ideal frequencies, structures and channels of communication are adopted, meaning that information is exchanged at the appropriate time, with the appropriate responsible persons and using the appropriate communication channel (i.e. efficiency) (Jentsch et al. 2015).

The relationship dimension of *commitment* "refers to an implicit or explicit pledge of relational continuity between exchange partners" (Dwyer et al. 1987). In an outsourcing partnership, both the vendor and the client have to allocate sufficient resources and effort to sustain and improve the relationship over time (Beimborn 2012; Goles and Chin 2005).

Trust has been described as a critical aspect for a successful outsourcing relationship (e.g. Goo et al. 2009; Willcocks and Kern 1998). It reflects a firm's belief that the partner firm will act in a way that will result in positive outcomes for the firm and to refrain from actions with negative outcomes (Hart and Saunders 1997). Trust can be categorized into two dimensions: relational trust (i.e. reliability and predictability) and

competence-related trust (Anderson and Narus 1990; Das and Teng 2001). Competence-based refers to confidence in the partner's capabilities to perform the task while relational trust is based on benevolence.

Shared or *mutual understanding* is defined as "the ability of IT and business [...] to understand and be able to participate in the other´s key processes" (Reich and Benbasat 2000). Shared understanding is a concept to analyze the social and organizational cognition of team members (Jentsch and Beimborn 2014) which essentially influences the performance within the collaboration (Wagner et al. 2014). Shared understanding is important for successful knowledge transfer and to enable the vendor staff to provide effective services to the client (Chang and Gurbaxani 2012; Rottman 2008).

The last relationship quality dimension is *fairness*. Perceiving the partner as being fair is necessary in order to create a win-win situation for both organizations. Forbearance (e.g. tolerating an isolated, minor underperformance) is important to establish a lasting relationship (Jentsch et al. 2015).

Social Network Analysis

According to Jansen (2006) a social network is a mesh of social relationships in which individuals, groups, collective or corporate actors are embedded. A network can be visualized by nodes and edges that represent the actors and the relationships between the actors in the network. SNA has been applied in research for a wide range of purposes, e.g. to examine the flow of information and collaboration clusters in organizations (Cross et al. 2005; Cross et al. 2006; Cross et al. 2010) or to reveal knowledge transfer (Nielsen and Tjørnehøj 2010).

SNA has been used in organizational contexts to improve collaboration and knowledge sharing (Cross et al. 2002; Cross et al. 2006; Ehrlich and Chang 2006, 2007; Nielsen and Tjørnehøj 2010). The use of SNA in the context of knowledge management is especially relevant, since knowledge sharing is crucial for successful outsourcing (Blumenberg et al. 2009; Rottman 2008).

As SNA has been applied for various reasons, there exist different metrics to analyze the characteristics of a social network. A selection of key network metrics is provided in Table 1.

Metric	**Explanation**
Degree centrality	Reflects the number of connections to other actors in the network, which can represent an actor's importance in the network (Gloor et al. 2003).
Degree centrality distribution	Describes the concentration of degree centrality in a network. Changing degree distribution can reflect changing power constellations (Ahuja et al. 2012).
Betweenness centrality	Corresponds to the number of times a person is located on the shortest path from any person to any other person (Cross et al. 2008; Freeman 1979). Can represent the interpersonal influence an actor has on others (Gloor et al. 2003) or indicates a bottleneck in the information flow (Cross et al. 2008).
Group betweenness centrality	Measures the homogeneity of betweenness of different actors: "1" in a star configuration, and "0" if all actors have the same degree of betweenness (Freeman 1979). Oscillating group betweenness centrality correlates with creativity (Kidane and Gloor 2007).
(Team) density	Reflects the proportion of potential edges between actors in the graph that are actually connected (Wasserman and Faust 1994); If a team has a high density, group members are more connected to each other which can indicate higher performance (Kidane and Gloor 2007).
Contribution index	The difference between outgoing and incoming messages relative total number of messages; indicates the individual or team performance (Gloor et al. 2008). $CI = \frac{messages\ sent - messages\ received}{messages\ sent + messages\ received}$

Tie intensity	A tie can be characterized as strong or weak: Strong ties are characterized by frequent interaction and high social/emotional closeness as opposed to weak ties (Granovetter 1973).
Response time	Expresses the (average) time it takes for emails to be answered which may correlate with performance (Gloor et al. 2008) and be a sign of commitment.

Table 1. Overview of most relevant SNA metrics

Recently, researchers have begun taking a dynamic perspective on networks to understand how they evolve and change over time (Ahuja et al. 2012; Kidane and Gloor 2007). Rather, than capturing network data at a single specific time, dynamic network analysis uses data captured at multiple points in time. Adopting a dynamic or longitudinal perspective is important, as a network can only be understood completely if the "genesis and evolution of the underlying network structure" is analyzed (Ahuja et al. 2012). For example, causal relationships cannot be understood if the network is examined statically (Brass et al. 2004). In addition it allows examining how actors in a network attempt to react to the network structure of which they are part of by actively shaping its structure (i.e. agency). Ahuja et al. (2012) further argue that an individual's benefits and constraints resulting from an individual's position in the network can be understood through dynamic network analysis, since possible benefits of an actor's position in the network may not last. Dynamic network analysis could be also applied to measure outsourcing relationship quality, because this type of analysis enables determining changes in the metric's values over time.

Research Approach

Our research approach follows a conceptual, construction-oriented methodology (Wilde and Hess 2006) to develop a framework for measuring relationship quality using SNA metrics. To do so, we incorporate findings from extant literature. However, the aim of this paper is not to do a structured literature review, but to follow a developmental approach.

To identify potentials of SNA metrics that can serve as measures or indicators for relationship quality, we searched for literature that applied specific metrics in an organizational context related or transferrable to our research question. In the first step we applied a keyword-based search in the journals of the 'AIS Senior Scholars' Basket', related journals, and in the proceedings of the main IS conferences (cf. Appendix Table 4). The search was applied to the title, keywords, and abstract, and was conducted by combining a keyword referring to SNA with a keyword describing a relevant context (cf. Table 2). To ensure that relevant studies were not missed, the papers found in the first step served as seed for forward and backward searches in the ISI Web of Knowledge (www.webofknowledge.com), according to the recommendations of Webster and Watson (2002).

SNA keywords	**Context keywords**
Social network analysis, Organizational analysis	Outsourcing, Performance, Software development, Distributed teams, Virtual teams

Table 2. Combinations of keywords used in the literature retrieval

The relevant papers were categorized either as papers on SNA methodology or papers applying SNA to examine subjects such as performance/effective communication, knowledge sharing, creativity/innovation and cross-hierarchy communication. Applicable findings were then mapped to dimensions of outsourcing relationship quality, which is the structure used in the following results section.

Results

This section derives and synthesizes theoretical arguments on the links between SNA concepts and relationship quality. Studies on SNA were applied to each of the relationship quality dimensions: For *communication*, SNA studies on worker productivity and creativity were found to be applicable and for *commitment* and *trust* research on distributed/virtual teams has been identified as being relevant. For *shared understanding* literature on knowledge exchange and homophily could be applied. On the other hand, meas-

uring the relationship quality dimension *fairness* was found to be problematic, as structural analyses cannot directly asses if the counterpart is acting in a fair way, e.g. demonstrating forbearance or attempting to create win-win situations. Concluding, fairness was found to be not sufficiently operationalizable by SNA metrics and thus excluded from the further development of our framework.

In the following we conceptualize how SNA metrics can serve as proxies for the different relationship dimensions.

Communication

The assessment of the *communication* dimension can be determined by focusing on the effectiveness of communication, power constellation, and the level of creativity and innovation.

Effective communication

As Cross et al. (2005) illustrate, the optimal network depends on the nature of the task. Networks delivering customized services (e.g. software development outsourcing) must be able to solve ambiguous problems using innovative solutions. They are characterized by permeable boundaries as well as decentralized decision and access rights as well as dense and redundant network connections.

Centrality measures have been found to correlate positively with performance of teams and individual actors. Ahuja et al. (2003) found degree centrality to be an even more reliable indicator for performance than the individual actor's characteristics. In the context of client support teams, Brunnberg et al. (2013) found that group degree and betweenness centrality correlate with high performance. This is because high degree and betweenness centrality indicate that the leadership within the team is centralized which allows the team to operate in a more stable and consistent manner.

The evolvement of betweenness centrality over time is also associated with effective communication: Changing betweenness centrality, is seen as sign of rotating leadership which lead to low performance in Brunnberg et al. (2013)'s study of client support teams while it correlated with higher creativity in the context of software development (Kidane and Gloor 2007).

Another metric associated with performance is the team density, i.e. the extent to which actors within a team or group are connected to each other (Brunnberg et al. 2013; Kidane and Gloor 2007). Kidane and Gloor (2007)'s explanation is that a higher density of the distributed teams, allows the team members to work more efficiently.

Besides centrality measures and density, Brunnberg et al. (2013) found that variance in the contribution index is associated negatively with performance: According to their study, it showed the importance of "clear communication with the clients' employees from always the same [...] managers". This may however not be the case for more versatile work requiring a greater amount of creativity.

Another factor favoring productivity is the balance of information that flows through employees (Cross et al. 2006). Too much information passing through a person may cause them to be 'overloaded'; if information has to go through a specific person (i.e. a bridge to another part of the network, high betweenness centrality), it can slow down information and decisions.

Several studies also focus on the average time a person takes to respond to emails (Aral and van Alstyne 2007; Brunnberg et al. 2013; Merten and Gloor 2010): Not surprisingly, the faster emails are answered, the higher the productivity of the person has been assessed.

The intensity of communication can be measured using degree centrality and the presence of strong ties and will be discussed under *trust*.

Power constellation

Power constellations, such as flat hierarchies, informal communication and communication across hierarchical boundaries have a positive impact on performance (Cross et al. 2006) and outsourcing success (Oshri et al. 2011).

The distribution of power is reflected by the concentration of degree centrality (Ahuja et al. 2012), whereas in teams the betweenness centrality can serve as a measure of how egalitarian the communication is (Gloor et al. 2003): A low concentration of degree centrality means that there is a low difference in power and low betweenness centralities of team members which reflects the degree to which employees can directly communicate to one another.

The contribution index proposed by Brunnberg et al. (2013) could also be applied at a company level to track which company contributes more and to detect significant discrepancies over time.

The power aspect of communication does however depend on the organization: Whereas in some outsourcing projects a high density network is preferred (client employees talk directly to their counterparts), in others a single point of contact or gatekeeper is explicitly defined and preferred (Leonardi and Bailey 2008; Wiesinger et al. 2012).

Creativity and Innovation

Innovative behavior of the vendor is often seen as important in outsourcing and demanded by the client organization, but is nonetheless difficult to achieve (Oshri et al. 2011). Various studies have shown that weak ties are essential for the diffusion of novel ideas and information (Cross et al. 2008; Granovetter 1973; Hansen 1999). Cross et al. (2008) analyzed highly innovative functional areas such as R&D and stress the importance of teams to include 'brokers' – team members who are "well positioned to be able to take an idea from one domain and see its potential for application in another domain." They also emphasize the importance of external ties to be connected to the right decision makers, to speed up transfer of information and thereby innovation.

Another indicator for creative teams is described by Kidane and Gloor (2007) who analyzed open source development projects: They showed that rotating leadership, meaning oscillating betweenness centrality and density, can be a predictor for creativity, as it allows various team members to contribute their ideas to the development process. Brunnberg et al. (2013) also examined the effect of low response times.

Commitment

Commitment reflects the provider's dedication towards the client (and vice versa) and can be measured by the responsiveness defined as "the willingness to help customers and provide prompt service" (Parasuraman et al. 1988). In the context of SNA, Gloor et al. (2008) measured response times of emails . To measure the level of commitment in an outsourcing relationship, we can track the evolution of a vendor's average response times to emails and phone calls. For example, an increased or decreased response time across all communication channels might be an indicator that the vendor has shifted priorities.

Another approach has been also developed by Gloor et al. (2008) in which the authors determine actor performance in virtual teams using the contribution index. They found that the most performing teams are teams with a high positive contribution index, which indicates that more messages were received than sent and could be interpreted as a high commitment towards the client.

Trust

The outsourcing literature argues that a high level of trust is required in outsourcing relationships (Kern 1997; Willcocks and Kern 1998), and can compensate contract incompleteness (Dyer and Singh 1998; Gulati 1995). Trust is also important because it fosters willingness to exchange information and knowledge (Levin and Cross 2004; Tsai and Ghoshal 1998). SNA studies have shown that trust tends to be accompanied by frequent communication and strong ties (Levin et al. 2002; Levin and Cross 2004). Since frequent communication does not necessarily entail trust (e.g. indeed distrust could manifest itself through frequent check-ups), it cannot be concluded that frequent communication always indicates trust. Inversely, however, if the relationship lacks frequent communication, there is probably no trust. Therefore, frequent communication, is a necessary, but not sufficient, condition for trust.

In terms of SNA metrics, frequent communication is reflected by a high degree centrality in the activity graph (the graph showing email interactions between employees) and correlates positively with increased trust among team members (Gloor et al. 2012).

A periodical assessment of the network structure can be used to discover changes in the dimension of trust. For instance, if the outsourcing partner suddenly switches to another communication channel, it can be a sign that something is wrong with the relationship (Jentsch et al. 2015). Other changes to look for can include changes of the degree centralities of actors which have been officially designated as contact persons in case of escalations. Another signal could be if superiors are suddenly being included in message exchanges (e.g. carbon copy). Monitoring for changes in communication patterns can therefore be insightful when assessing trust.

Shared Understanding

Shared understanding is difficult to measure directly by assessing the network structure. However, in an outsourcing relationship, shared understanding is essential for effective knowledge transfer (Blumenberg et al. 2009; Chang and Gurbaxani 2012; Rottman 2008). Different kinds of ties are required for identification of knowledge sources and for knowledge transfer: Hansen (1999) found that weak ties are crucial for gaining novel ideas or information, since an actor's strong ties in a social network tend to be connected to the same persons. The actor's strong ties are therefore likely to possess the same information as the actor him- or herself and will not have valuable new information. As Granovetter (1973) found, weak ties are important to gain access to new, non-redundant information which is not found in the same cluster as the actor him or herself. The transfer of non-redundant information therefore occurs through weak ties. Having connections to many weak ties allows gaining information from inhomogeneous network clusters. These findings were confirmed in the context of globally staffed software development teams: "People use others on their team with whom they have strong ties to exploit preexisting knowledge, but they go to people they know uniquely outside the team for innovative ideas." (Ehrlich and Chang 2006). In addition to the existence of weak ties, Ehrlich and Chang (2006) found that the frequency of communication is positively correlated with awareness of information sources and familiarity. Thus, it is important that actors understand where information they need are located in the network.

In the context of outsourcing these findings play a crucial role in the discussions of shared understanding. We can see that weak ties between actors are important to gain novel knowledge, while strong ties are indicators that the information is successfully transferred between the actors, i.e. the actors have the same information. Because the successful transfer of knowledge between the client and the provider is crucially important for the success of the outsourcing collaboration, we need to determine strong ties between actors on the client-side and the provider-side.

The concept of homophily extends the concept of strong ties: Homophily refers to the tendency of actors to connect to actors that are similar to them in some way (McPherson et al. 2001). Actors with similar characteristics (homophily) tend to share the same values and beliefs (social shared understanding) (e.g. Rao and Ramachandran 2011), thus supporting the transfer of knowledge. On the other hand, SNA literature suggests that high level of homophily can be a barrier to new ideas and innovation, as homophilly prevents building relationships to people that are different and who could contribute new ideas ways of thinking. Thus, homophily can be an indicator that actors have a shared understanding of the same information and consequently work more effectively together than actors with no information overlaps, while keeping in mind that a (too) high level of homophily can cause information silos. Thus, an ideal network is attributed by an adequate level of homophily to work effectively together and actors are connected to sufficient weak ties to gain necessary novel information if needed.

To conclude, the relationship quality dimensions *communication*, *commitment*, *trust* and *shared understanding* can be measured using different SNA metrics. The assessment of the *communication* dimension is primarily based on examining the evolution of degree and betweenness centrality measures of the persons involved. To measure *commitment*, we can apply the contribution index and response times, while trust can be determined by looking at strong ties and communication frequency. Finally, for measuring the dimension of *shared understanding*, weak ties and homophily are metrics to analyze the effects of knowledge exchange. Table 3 provides an overview of the metrics that have been identified as being suitable for the measurement of the outsourcing relationship quality dimensions and summarizes our propositions on how outsourcing relationship quality can be tracked by looking at social network data. In the table, we further describe which attribute values are associated with high relationship quality between outsourcing partners.

Dimension	Indicator and values	Source
Communication	Efficient communication:	
	• High degree and betweenness centrality	Brunnberg et al. (2013), Ahuja et al. (2003)
	• Strong ties within teams, steady team density and betweenness centrality	Brunnberg et al. (2013), Kidane and Gloor (2007)
	• Balanced betweenness centrality	Cross et al. (2006)
	• Constant contribution index	Brunnberg et al. (2013)
	• Low response times	Brunnberg et al. (2013)
	Power constellation:	
	• Sufficient connections across boundries	Oshri et al. (2011)
	• Low concentration of degree centrality distribution	Ahuja et al. (2012)
	• Low team betweenness	Gloor et al. (2003)
	• High density	Cross et al. (2005)
	• Balanced degree centrality	Kidane and Gloor (2007)
	Creativity / innovation potential:	
	• Weak/indirect ties to clusters containing relevant information sources	Hansen (1999)
	• Oscillating betweenness centrality, density, rotating leadership, low response times	Brunnberg et al. (2013), Kidane and Gloor (2007)
Commitment	• Low response times	
	• High, positive contribution index	Gloor et al. (2008), Kidane and Gloor (2007)
	• No drastic decreases in communication volume/message size	
Trust	• Necessary condition: strong ties, frequent interaction	Vlaar et al. (2008)
	• No drastic changes in degree centrality of gatekeepers, carbon copy messages	Ahuja et al. (2003), (Gloor et al. 2012)
Shared Understanding	• Strong ties/ frequent interaction	Hansen (1999), Ahuja (2000), Ehrlich and Chang (2006)
	• Sufficient level of homophily	
	• Sufficient weak/indirect ties	Granovetter (1973), Hansen (1999), Ehrlich and Chang (2006)

Table 3. Network characteristics associated with high relationship quality

Contribution

In this study we presented and discussed how social network analysis methods can be applied to examine outsourcing relationships. Based on a search in the field of SNA methods, network metrics were identified to measure the crucial dimensions of relationship quality – i.e. communication, commitment, trust and shared understanding. With these metrics we can provide potentially more objective methods for measuring relationship quality, compared to surveys or polls, as these methods do not interrupt employees during their work and analyze the 'lived' and not perceived reality.

Our study contributes to future research in this field as it provides fundamental suggestions for the measurement of outsourcing relationship quality by the use of SNA metrics. The benefits are twofold: First, when selecting relevant SNA metrics to examine, researchers can take as a starting point the catalogue of SNA metrics identified in this paper. This study provides extensive theoretical arguments explaining why the SNA metrics are linked to the relationship quality dimensions. Second, our discussion of the metrics' values helps interpreting the network in terms of relationship quality.

Our study also lays the conceptual foundations for the development of a measurement instrument that can automatically capture and process data for analyzing the quality of an outsourcing relationship. These metrics could provide potentially more objective methods for measuring relationship quality, compared to surveys or polls, as these methods do not interrupt employees during their work and analyze the 'lived' and not perceived reality. Automated approaches will provide the efficiency gains required to monitor the relationships with a large number of outsourcing partners on a regular basis.

Limitations and Further Research

There are, however, limitations of the proposed approach to measuring relationship quality. The supposed relation between network metrics and relationship quality should be validated quantitatively. The relations may also vary under different organizational contexts and outsourcing projects. For example, the indicator of *steady* betweenness centrality correlates with performance for workers with primarily executing tasks as opposed to highly creative workers where performance is correlated with *fluctuating* betweenness centrality. The communication paradigm favored by the vendor (single point of contact vs. gatekeeper) may also affect network metrics, but not necessarily reflect better or worse relationship quality.

Furthermore, each metric's interpretation depends on how the network boundaries are defined. For example, the betweenness centrality would be different if network examined contains only the employees directly involved in the outsourcing arrangement or also indirectly involved employees (e.g., client-side users of IT systems provided by the vendor or offshore vendor personnel 'behind' the onsite liaisons). A low betweenness centrality of directly involved employees can be desirable, as it means that everyone can communicate directly with each other. However, this does not mean that the overall network encompassing all employees should have a low betweenness centrality.

In future research, quantitative studies are necessary to confirm the deduced links between relationship dimensions and metrics. The relationship between SNA metrics and dimensions of relationship quality should be validated in further studies and take into account different organizational contexts and sourcing arrangements. Furthermore, future research should take a look at methods to be used complimentary to SNA which can contribute to gain a broader and more accurate picture of relationship quality. Promising approaches include sentiment analysis which focuses on the content of messages communication exchanges, rather than merely the communication structure and could be a promising approach to automating the analysis. Finally, a design science approach could be used to develop a prototype and to test the feasibility of analyzing communication data in a real-world scenario. This would allow efficiently measuring the relationship quality of a large number of outsourcing partners without interfering with the daily business by analyzing a high number of relationships based on the communication exchanges and can provide an early warning system which reacts before the project fails due to relational reasons.

To take into account different organizational and project contexts, an automated solution would need to learn the communication patterns of each particular setting, possibly using a machine learning approach that uses initial human feedback during to train the algorithm. Practical questions such as privacy issues and the effort required to adapt the tool to different contexts have of course also to be addressed before such a system is applied in a real-world environment. However, in times of big data and analytics it seems

to be a promising approach to get more transparency into the social dynamics of an outsourcing relationship and thus to help making outsourcing management more effective and sustainable.

Conclusion

In this paper, we have drawn a bridge between SNA metrics and the dimensions of outsourcing relationship quality. We did not only identify relevant network metrics, but also discussed how these metrics can serve as proxies for the different relationship quality dimensions. Employing SNA in outsourcing contexts is promising for research and practice, as it can provide deep insight into the outsourcing partnership and has the potential to enable a more objective, reliable and efficient way of assessing outsourcing relationship quality. In the future, these findings could be used to develop an automated tool to monitor relationship quality and to help executives to track the quality of their outsourcing arrangements.

Applying SNA in a workplace to optimize the social structure is part of a larger trend. As industrialized nations shift more and more to a service-dominated economy, communication among knowledge workers is becoming increasingly important (Belanger 1999). Whereas optimization projects previously targeted industrial processes, optimizing knowledge work is the logical next step (Fischbach et al. 2009). Rather than simply measuring relationship quality, SNA can be used to engineer social constellations for working effectively and to optimize the social aspects of knowledge intensive sourcing arrangements.

Appendix

European Journal of Information Systems	Information Systems Journal	Information Systems Research	Journal of the AIS
Journal of Information Technology	Journal of MIS	Journal of Strategic Information Systems	MIS Quarterly
International Journal of Information Management	International Conference on Information Systems (ICIS)	Americas Conference on Information Systems (AMCIS)	International Conference on Collaborative Innovation Networks

Table 4. Outlets considered for the literature review

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